

THE HISTORY AND TRUE IDENTITY OF *MELITAEA ISMERIA* (NYMPHALIDAE): A REMARKABLE TALE OF DUPLICATION, MISINTERPRETATION, AND PRESUMPTION

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ABSTRACT. John Abbot (1751–ca. 1840) supplied the watercolor drawing for the original description and accompanying engraved plate of *Melitaea ismeria* Boisduval and Le Conte. The plate was poorly executed, resulting in 170 years of debate regarding the identity of the figured species. Most authors treated *M. ismeria* as synonymous with *Chlosyne gorgone* (Hübner). More recently, a neotype of *M. ismeria* was designated to reflect synonymy with *Chlosyne nycteis* (Doubleday), resulting in a proposed priority replacement of *nycteis*. During a study to evaluate these findings, the original drawing of *M. ismeria* was discovered. John Abbot copied this drawing from an earlier painting of *C. gorgone*. Two other duplicates of this *C. gorgone* illustration were also located. The figured early stages and hostplant are consistent with *C. gorgone*. The proposed priority replacement of *nycteis* is therefore unwarranted. Also included are details about the drawings used by Boisduval and Le Conte and the discovery of a specimen of *C. gorgone* attributed to John Abbot.

Additional key words: *Chlosyne*, Georgia, John Abbot, larva, pupa, South Carolina.

Klots (1951) considered *Melitaea ismeria* Boisduval & Le Conte, [1833] to be “one of our greatest problems.” Miller & Brown (1981) called it “a nomenclatural headache.” Due to a poorly engraved illustration that accompanied the original description, *M. ismeria* has remained enigmatic for 170 years. Since 1840, most authors have treated *M. ismeria* as synonymous with the insect now recognized as *Chlosyne gorgone* (Hübner, [1810]), but enough uncertainty remained as to permit alternative interpretations. Attempts to resolve this dilemma were as intriguing as the taxon itself and included a great deal of misleading information. The most recent was Gatrell (1998) who considered *M. ismeria* to be synonymous with *Chlosyne nycteis* (Doubleday, [1847]). He designated a specimen of *C. nycteis* as the neotype of *M. ismeria*, resulting in the priority replacement of *nycteis*. I now submit new evidence that correctly defines the intended species and contradicts the findings of Gatrell (1998). These results finally bring resolution to this troublesome and persistent mystery.

MATERIALS AND METHODS

Historical literature pertaining to *M. ismeria* was examined in detail and the conclusions of Brown (1974) and Gatrell (1998) were evaluated. The publication history of Boisduval & Le Conte ([1833]) was investigated through the works of Oberthür (1920), dos Passos (1962), and Cowan (1969). Photocopies, microfilm, digital scans, and digital photographs of specimens, published figures, original illustrations, manuscript notes and other relevant data were obtained for analysis from many sources, including the Alexander Turnbull Library (Wellington, New Zealand), Allyn Museum of Entomology (Florida Museum of Natural History, Sarasota), Florida State Collection of Arthropods (FSCA, Division of Plant Industry, Florida Dept.

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of Agriculture and Consumer Services, Gainesville), Houghton Library (Harvard University), Macleay Museum (University of Sydney, New South Wales, Australia), The Natural History Museum, London (BMNH), Thomas Cooper Library (University of South Carolina), and Wittenberg University Library (Springfield, Ohio). Specimens and photographs of early stages were obtained from several sources. Comparative studies were conducted using original Abbot illustrations, species of *Chlosyne*, as well as engraved figures in Boisduval & Le Conte ([1833]) and Smith & Abbot (1797) (authorship of this publication follows Wilkinson (1981)). Detailed biographies of John Abbot by Rogers-Price (1983) and Gilbert (1998) were consulted to more fully understand Abbot's life and artwork.

RESULTS

Original description. *Melitaea ismeria* was described and figured in *Histoire Générale et Iconographie des Lépidoptères et des Chenilles de l'Amérique Septentrionale* by renowned French entomologist Jean Baptiste Alphonse Boisduval (or Déchauffour de Boisduval) (1799–1879) and wealthy American naturalist John Eatton Le Conte, Jr. (1784–1860), whose surname is still in contention. His name was given as “Leconte” in this and other publications. Rehn (1954) believed that the family preferred “Leconte,” but Cowan (1969) considered this to represent the historical version used by earlier Huguenot family members before they fled France to escape religious persecution. I have employed the version used by J. E. Le Conte himself, who plainly signed his name as “Le Conte” (see Scudder 1889, vol. 2, frontispiece). His famous nephew, Joseph (who referred to J. E. Le Conte as “Uncle Jack”), also signed his name as “Le Conte” and used only this version in his detailed autobiography (Armes 1903). Many documents from the Le Conte family are deposited in the library of the American Philosophical Society, Philadelphia. Robert S. Cox,

Curator of Manuscripts, confirmed (pers. com.) that "Le Conte" is the correct version for this family. The compressed variation, "LeConte," is also frequently used (e.g., Bigley 2001).

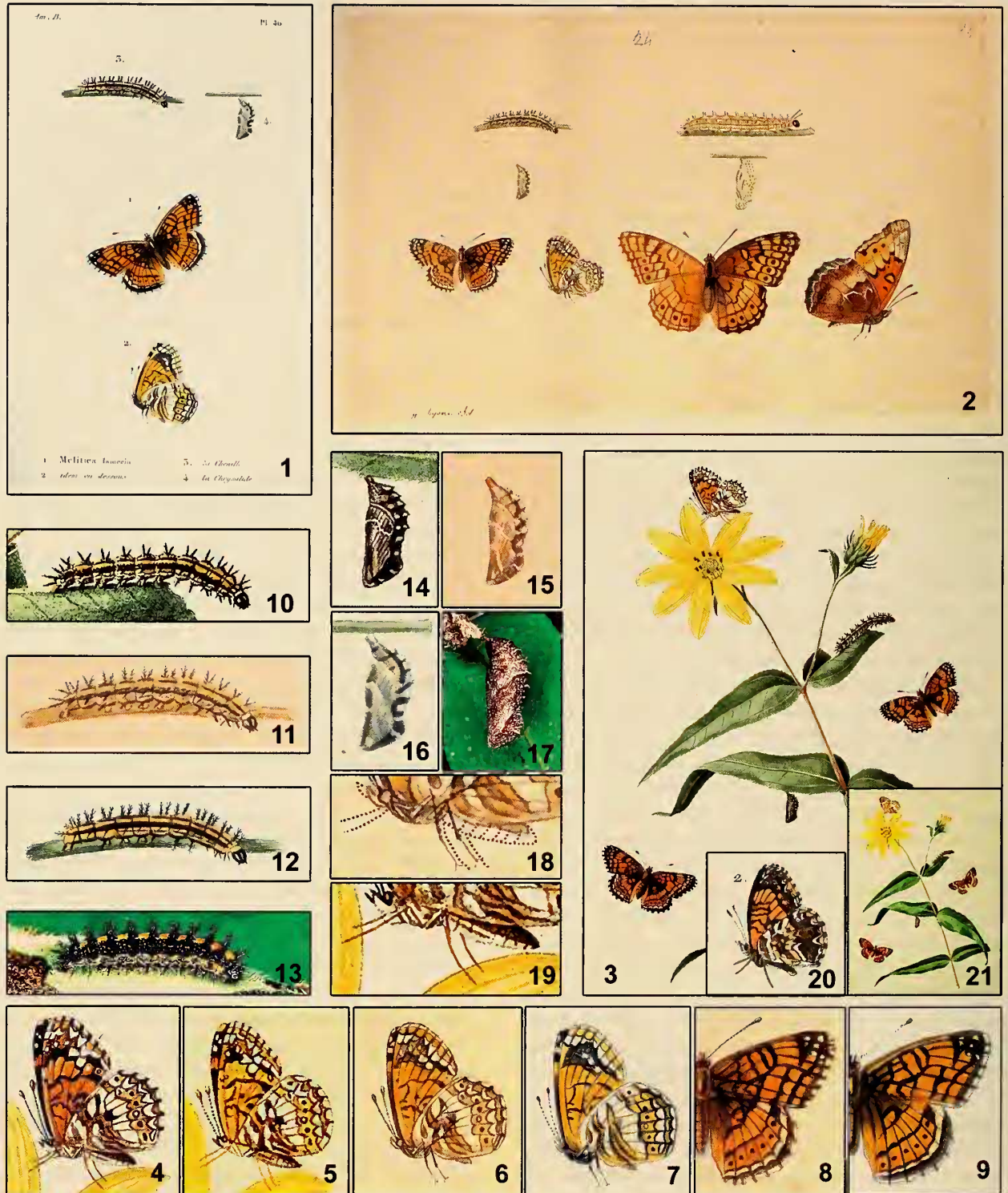
The cover page of most editions of *Histoire Générale* was dated 1833, but the plates and accompanying text were issued in 26 livraisons (fascicles) from 1829 to 1837 (dos Passos 1962, Cowan 1969). The publication included 78 hand-colored engraved plates, three issued per livraison. *Melitaea ismeria* was described on pages 168–169 and figured on Plate 46, which included depictions of a dorsal female, ventral female, mature larva, and pupa (Figs. 1, 7, 9, 12, 16). Boisduval probably based his species name on Ismeria, a beloved Sudanese woman who married the son of William II of France in the 13th century. The brief Latin description reads "*Alis subdenticulatis, supra nigro fulvoque variis, anticis apice albo punctatis; posicis subtus fasciis albis fulvisque, serieque punctorum nigrorum*" (wings finely toothed, above variably colored with orange and black, white spots near the apex; hindwings below with light orange bands and a series of black spots). Longer French descriptions of the adult, larva and pupa were also included. It was stated in French that, "This *Melitaea* is found in Carolina and Georgia. It is very rare in collections."

A printed notation at the bottom of Plate 46 of *M. ismeria* reads "Abbot pinx." Most of the plates in Boisduval & Le Conte ([1833]) were reproduced from original drawings by John Abbot (1751–ca.1840), an English artist and naturalist who resided in Georgia from 1776 until his death. Notations on other plates refer to French naturalist Émile (or Charles Émile) Blanchard, J. E. Le Conte, and artist/engraver Paul C. R. C. Duménil (misidentified by Gilbert (1998) as French naturalist André M. C. Duméril). dos Passos (1962) credited 62 plates to Abbot, while Gilbert (1998) listed 65. However, some of the plates attributed to Abbot in Boisduval & Le Conte ([1833]) were undoubtedly not derived from his work. These include West Indian *Eurytides celadon* (Lucas) (as *Papilio sinon*, Plate 3), *Battus devilliers* (Godart) (as *P. villiersii*, Plate 14), and *Battus polydamus* (L.) (as *Papilio polydamus*, Plate 15), as well as Asian *Leptosia nina* (Fabricius) (as *Pieris chlorographa*, Plate 17). The text confirms Abbot's unlikely involvement in these plates: the American distribution of the papilionids was given as "la Floride" and the inclusion of *L. nina* was based on two specimens of dubious North American origin. These illustrations are more consistent with the work of Duménil, who probably drew the originals from specimens in Boisduval's extensive collection.

Despite the collaboration of so many artists and engravers, many of the published plates were poorly exe-

cuted. In the preface to livraison ten, Boisduval announced that, "certain of our subscribers have complained that, although our figures are accurately colored, they are not well drawn; most of the bodies are defective, with the wings and legs badly attached and the veins faulty. I am the first to recognize that one has the right to expect an amount of perfection, as this is acceptable, but these drawings were not totally created in France, but in North America by Mr. Abbot through my collaborator Mr. Leconte of New York, who has paid for his faithful drawing and coloring of wings, bodies and legs. I have attempted to change nothing among the original figures, but in the future, in order to avoid problems, and along with the publisher who will not sacrifice perfection of the publication, I will have the plates retouched to conform to the nature of Mr. Abbot's drawings and repair any inaccuracies when present. Subscribers may be assured that from delivery 10 our figures will no longer show these faults" (translation from French). Plate 46 of *M. ismeria* was published in livraison 19 during 1833–34 (dos Passos 1962), thus the engraving may have been altered prior to the prints being issued. Abbot did not supervise the creation and alteration of the plates, thus many of his drawings lost their distinctiveness in the reproduction process (Rogers-Price 1983). Unsatisfactory efforts of engravers and colorists were a concern for many artists of the eighteenth and nineteenth centuries. This problem was especially acute for Abbot, whose renderings were very meticulous (Wilkinson 1984). The first 30 plates for Boisduval & Le Conte ([1833]) were engraved under the supervision of P. Duménil. Either because Duménil retired, or was disgusted by earlier criticisms of his work, another prominent engraver named Borromée completed the remaining 48 plates, including that of *M. ismeria* (Oberthür 1920, Cowan 1969).

Although Boisduval made efforts to improve the plates, many remained unsatisfactory. To make matters worse, the precision of the plates varied from copy to copy, depending upon the vagaries of the colorists. Among numerous letters written between English lepidopterist Edward Doubleday and American entomologist Thaddeus W. Harris, Doubleday observed in 1840 that the plates were "poorly colored and not exact," while Harris complained that some of the figures were "miserably represented" (Scudder 1869). In 1883, Albert C. L. G. Günther (Keeper of Zoology, British Museum, 1875–95) remarked, "many of these productions are so unsatisfactory that many of them can only be determined by reference to the originals" (Gilbert 1998). In the years following the description of *M. ismeria*, lepidopterists failed to document specimens that clearly matched the published plate, sug-



FIGS. 1-21. *Melitaea ismeria* and *Chlosyne gorgone*. 1, Plate of *M. ismeria* in Boisduval & Le Conte ([1833]). 2, John Abbot drawing that includes original figures of *M. ismeria* (left). 3, Abbot painting of *C. gorgone* for John Francillon*. 4, Ventral adult *C. gorgone* by Abbot for Francillon*. 5, Ventral adult *C. gorgone* by Abbot for William Swainson. 6, Original ventral figure of *M. ismeria*. 7, Ventral *M. ismeria* in Boisduval & Le Conte ([1833]). 8, Original dorsal figure of *M. ismeria*. 9, Dorsal *M. ismeria* in Boisduval & Le Conte ([1833]). 10, *C. gorgone* larva by Abbot for Francillon*. 11, Original larva of *M. ismeria*. 12, Larva of *M. ismeria* in Boisduval & Le Conte ([1833]). 13, *C. gorgone* larva, fm. 'bicolor'. 14, *C. gorgone* pupa by Abbot for Francillon*. 15, Original pupa of *M. ismeria*. 16, Pupa of *M. ismeria* in Boisduval & Le Conte ([1833]). 17, *C. gorgone* pupa. 18, Enhanced sketch lines on original ventral figure of *M. ismeria*. 19, Body of ventral *C. gorgone* by Abbot for Francillon*. 20, Ventral figure of *Dryas gorgone* by Jacob Hübner. 21, Abbot painting of *C. gorgone* for William Swainson. (* © The Natural History Museum, London)

gesting that it did not represent a valid species, or was poorly engraved and lacked the precision of the original drawing.

A John Abbot painting. In a letter dated 27 May 1840, E. Doubleday told T. W. Harris that he had "cursorily examined Abbot's drawings in the British Museum" and that they included "a vast number of Abbot's manuscripts" (Scudder 1869). The first illustration Doubleday mentioned was "*Melitaea ismeria*" and he transcribed the accompanying manuscript notes as "Feeds on crosswort. Frequents the oak woods of Burke County, but is not common. Caterpillar suspended itself May 16th, changed to chrysalid May 17th. Butterfly appeared May 26th." Doubleday asked Harris, "Do you know this species? The name I think is Boisduval's. The drawing has no name to it." Doubleday obviously noted a resemblance between this painting and the published plate of *M. ismeria*.

Nearly 30 years later, American entomologist Samuel H. Scudder read Doubleday's 1840 letter while preparing to publish the correspondences of T. W. Harris (Scudder 1869). He received additional information on the Abbot illustrations in the British Museum from John. E. Gray (Keeper of Zoology, 1840–75; letter dated 1 October 1869, Houghton Library, Harvard University). In 1871, Scudder visited the British Museum and personally examined these paintings (Scudder 1872a). He sketched copies of at least 22 of the figured larvae and pupae, which he later published (Scudder 1889). Scudder found the painting mentioned by Doubleday and identified the depicted species as "*Ismeria (carlota)* Reek. [sic.]." He summarized Abbot's associated notes as "Feeds on cross wort (*Helianthus trachelifolius?*) and sunflower; frequents oak woods of Bruke [sic.] Co., but is not common; tied up May 15; chrysalis May 17, from which imago May 26." Like Doubleday, Scudder perceived a similarity between this painting and the published plate of *M. ismeria*. He also believed that it represented the same species as *Eresia carlota* Reakirt, now generally considered a subspecies of *C. gorgone*. Because *ismeria* had been described 33 years prior to *carlota*, Scudder (1872b, 1875, 1889) gave priority to *ismeria*. Strecker (1878) credited Scudder with resolving the identity of *M. ismeria* and wrote, "There has been some uncertainty as to what Bdl.-Lec.'s figures really represent. There can no longer be any doubt that they were intended to illustrate this species [*C. gorgone*]." Henry Edwards (1889) remained unconvinced about *ismeria*, stating, "there is still some doubt as the this species." Nonetheless, most subsequent authors followed Scudder's arrangement and associated *ismeria* with the insect now recognized as *C. gorgone*. Holland (1898),

Seitz ([1907]–1924), and Clark & Clark (1951) even identified their published figures of *C. gorgone* as *Phyciodes ismeria* and *Melitaea ismeria*.

In 1950, Norman D. Riley (Keeper of Entomology, BMNH, 1933–55) contacted Georgia naturalist Lucian Harris, Jr. regarding the John Abbot painting in London. Harris (1972) attributed it to *C. gorgone* and noted, "Abbot's drawing is labeled *Melitaea ismeria*." Abbot's associated notes were transcribed as "It frequents the oak woods of Burke County but is not common. Caterpillar feeds on crosswort and sunflower. It tied itself up by the tail 16 May, changed into chrysalis 17, bred 26th." This offers a slightly different version from that of Doubleday (Scudder 1869) and Scudder (1872a). Based on specimens collected by Harris, Klots (1951) mentioned that, "a few *gorgone* females taken recently in Georgia lean toward *ismeria*." Harris (1972) later figured three such *C. gorgone* specimens as "transition near *ismeria*." After decades of research on the butterflies of Georgia, Harris agreed with the synonymy of dos Passos (1969) and concluded, "*ismeria* was named for a variant specimen of *C. gorgone*." Neck (1975) referred to Harris' figured specimens and also suggested, "a likely solution to the nomenclatural problem is that *ismeria* is an extreme form of *gorgone*."

The late F. Martin Brown did not readily accept the synonymy of *M. ismeria* and *C. gorgone* (dos Passos 1969). This conviction led Brown to more deeply explore the subject and he remains the only author to examine in detail the nomenclatural history of the names *ismeria*, *gorgone* and *carlota* (Brown 1974). To evaluate the synonymy of *ismeria* and *gorgone*, Brown asked entomologists at the British Museum (Natural History) to examine the Abbot artwork deposited there, including the painting mentioned by Scudder (1872a). Brown recorded Abbot's notes for this painting as, "The caterpillar feeds on the Crop Wort, and Sun Flower. It tyed itself up by the tail, 16th May, changed into Chrysalis 17th, Bred 26th. It frequents the Oak Woods of Burke County, but is not common." Once more, this offers a slightly different version than those given previously. Brown concluded that this painting did not serve as the model for the published plate of *M. ismeria*. He also unsuccessfully compared the published larva and pupa of *M. ismeria* with descriptions of immature *C. gorgone*, *C. nycteis*, and *Chlosyne harrisii* (Scudder). As a result, he still could not comfortably assign the published figures to any known species of *Chlosyne*. He proposed that *ismeria* be considered "*nomen incognitum*" (= *nomen dubium*), as had Higgins (1960). Unfortunately, Brown did not reproduce or discuss details of the Abbot painting in London.



FIGS. 22–25. John Abbot specimen and illustrations of *C. gorgone*. 22, Dorsal male painting for Francillon*. 23, Dorsal (left) and ventral of male specimen in The Natural History Museum, identified by E. Doubleday as *M. ismeria*. 24, Ventral painting for Francillon*. 25, Labels for specimen in The Natural History Museum and (bottom) original Abbot label from beetle in Macleay Museum. (* © The Natural History Museum, London).

The John Abbot painting first mentioned by Doubleday (Scudder 1869) was transferred in 1883 from the British Museum, Bloomsbury, to the newly completed South Kensington location (Günther 1912). Originally called the British Museum (Natural History) (or BMNH), this institution is now known as The Natural History Museum, London. The Abbot watercolor measures 23 cm × 30 cm and was among those completed between 1790 and ca. 1816 for John Francillon (1744–1816), a London jeweler who collected Abbot's drawings and specimens and acted as his agent, selling duplicates to the naturalists of Europe (Rogers-Price 1983) (he is also famous for having sold the Hope Diamond in 1812). Francillon had divided his Abbot illustrations into 17 bound quarto volumes. This painting is Plate 7 of Folio 34, Volume 16. Volume 16 contains 130 paintings and is dated ca. 1816 (V. Veness pers. com.), which is consistent with Abbot's manuscript reference to Burke County (he departed Burke County in 1806 to reside in Savannah, Chatham County, Georgia). The painting depicts life-sized dorsal aspects of male and female adults, ventral female, mature larva, pupa, and hostplant (Fig. 3). Inscribed in ink on the previous page are the following notes written in Abbot's hand (confirmed from digital scan); "Tab. [Plate] 7. Papilio. Cross wort Frittillary [sic.] Butterfly. The Caterpillar feeds on the Cross Wort, and Sun Flower. It tyed itself up by tail 16th May, changed into Chrysalis 17th, Bred 26th. It frequents the Oak Woods of Burke County, but is not common." Scudder's (1872a) date of May 15th was in error, as was the reference by Brown (1974) to "Crop Wort." Although Harris (1972) stated that the illustration was labeled as *M. ismeria*, there is no such inscription associated with the painting or notes. Harris (1972) and Brown (1974) also mistakenly believed the notes were written on the painting itself. Oddly, none of the previous authors mentioned Abbot's common name for the butterfly.

The notation "*Helianthus trachelifolius*" is inscribed

faintly in pencil on the notes page, not on the painting as stated by Harris (1972) and Brown (1974). It is not written in Abbot's hand. Doubleday did not mention this notation in his 1840 letter, but Scudder saw it during his visit to the British Museum in 1871. Although Brown (1974) could not determine the origin of this entry, Scudder (1872a) postulated that botanical identifications had "in most cases, been inserted . . . by some subsequent student." *Helianthus trachelifolius* (or *trachelifolius*) Miller (Asteraceae) is now generally considered a junior synonym of *Helianthus decapetalus* L. (Asteraceae) (Heiser et al. 1969, Cronquist 1980, Kartesz 1994, USDA 2003). Charles B. Heiser, authority on the genus *Helianthus*, and prominent Florida botanists Richard P. Wunderlin and Mark A. Garland examined a digital photograph of the painting and agreed the plant actually represents *Helianthus divaricatus* L. (Asteraceae), a widespread species in Georgia. *Helianthus decapetalus* (= *trachelifolius*) is restricted in Georgia to the mountainous Blue Ridge and Piedmont regions (Duncan & Kartesz 1981, Jones & Coile 1988, USDA 2003). Although I was unable to locate herbarium specimens of *H. divaricatus* from Burke County, Georgia, accurate botanical illustrations by Abbot could be considered as valid records (Ewan 1985). The illustrated adult butterflies clearly represent *C. gorgone* (Figs. 3, 4, 22, 24), which Scudder (1872a) identified as *carlota*. The associated sunflower, *H. divaricatus*, is the only known hostplant of *C. gorgone* within the coastal plain region of eastern Georgia and adjacent portions of South Carolina (Gatrelle 1993, 1998).

Various authors (e.g., Harris 1972, Opler and Krizek 1984) have assumed Abbot's "cross wort" hostplant of *C. gorgone* referred to a species of *Lysimachia* L. (Primulaceae), but Abbot apparently used this common name for *H. divaricatus*. In Smith & Abbot (1797), Abbot gave "cross-wort" as the primary hostplant for *Phalaena phyllira* Drury (= *Grammia phyl-*

lira) (Arctiidae) and his associated Plate LXIV portrays the same species of sunflower as in his *C. gorgone* painting. In the text, J. E. Smith (a competent botanist) correctly identified Abbot's figured plant as *H. divaricatus*. Furthermore, Abbot's common name for *C. gorgone* was the "Cross Wort Frittilary," and he illustrated the species with *H. divaricatus*.

An alternative theory. Gatrell (1998) did not locate John Abbot's original drawing of *M. ismeria*, but announced, "enough evidence now exists to resurrect *ismeria* and define it correctly as that insect long known as *C. nycteis*." He collected three male *C. nycteis* on 20 August 1989 at mud along the Savannah River in Burke County, Georgia, and designated one of these specimens as the neotype of *M. ismeria*. Because *ismeria* was described 14 years earlier, he proposed the priority replacement of *nycteis*. Despite his statement that *C. nycteis* specimens from Burke County "possess all the major phenotypic characters of the original painting of *ismeria*," he did not examine Abbot's original drawing and based his comparisons strictly on the published plate. He considered populations of *C. nycteis* distributed from eastern Georgia, across northern Florida to southern Louisiana as *C. ismeria ismeria* and other eastern populations as *C. ismeria nycteis*. Western North American populations would be referable to *C. ismeria drusus* (W. H. Edwards) and *C. ismeria reversa* (F. & R. Chermock) (Gatrell 1998, 2000b). Gatrell also collected specimens of *C. gorgone* in eastern Georgia and designated the neotype of *Dryas reticulata gorgone* Hübner, apparently unaware that Hübner's intermediate name, "*reticulata*," is comparable to a subgeneric category and was not intended as part of the name of the insect (Hemming 1937). Both of Gatrell's neotypes are deposited in the Allyn Museum of Entomology, Florida Museum of Natural History, Sarasota, Florida.

Gatrell primarily based his arguments on the conclusions of Brown (1974) and John Abbot's life history notes, but he committed critical errors with this approach (see Discussion). Doubts about the validity of his neotype designations prompted Gatrell (2000a) to defend his publication format as compliant with ICZN (1999). Koss (2000) disagreed with Gatrell's findings about the identity of *M. ismeria* and hesitantly suggested that *C. harrisii* was the intended species. It was obvious that additional proof was still necessary to confirm the identity of *M. ismeria*. As Brown (1974) surmised, John Abbot's original drawings would "provide the proper measure of accuracy."

Original drawings for Boisduval & Le Conte ([1833]). Oberthür (1920) and Cowan (1969) summarized the early history of an original set of drawings

used for the published plates in Boisduval & Le Conte ([1833]). Cowan lost track of them after 1963. Art historian Vivian Rogers-Price (1983) relocated these drawings and offered a brief historical overview up to that time. Her treatise was published as an exhibition catalog and was overlooked by lepidopterists. Based on an exhaustive review of historical and contemporary evidence, I now offer a detailed account that connects these original drawings with the published plates of Boisduval and Le Conte. Discovered in this set of watercolors is the original drawing of *M. ismeria*.

In the front of a copy of Boisduval & Le Conte ([1833]), shelved in the Entomology Library, The Natural History Museum, London, is a brief inscription that reads, "The originals of these plates passed into the possession of M. Chas. Oberthür from the library of Dr. Boisduval. Seen by F. A. Heron, 11 × 1904" (P. Ackery pers. com.). Francis A. Heron served as Assistant-in-Charge of Butterflies for the British Museum (Natural History) from 1901–10 (Harvey et al. 1996). At least 25 years earlier (probably in 1871), S. H. Scudder had visited Boisduval in Paris who showed him drawings by John Abbot that were "contained in a little oblong folio volume, on sheets broader than high (27 × 16.5 cm), instead of on ordinary large folio sheets" (Scudder 1888). Scudder obtained permission from Boisduval to draw at least 23 of the figured butterfly larvae and pupae. Scudder later published these copies and confirmed that the original figures were "formerly used in Boisduval and Leconte's Iconography" (Scudder 1889). Holland (1898) and Klots (1951) also reproduced some of the figures copied by Scudder. I discovered Scudder's loosely written notes about these drawings in the Houghton Library, Harvard University. Under the heading "Abbot's Drawings in Boisduval's Possession," Scudder identified the butterfly species depicted in the drawings, listed the illustrated early stages, and indicated the figures he desired to copy. At a later date, Scudder haphazardly inserted J. E. Le Conte's name into the title of the notes because he suspected that some of the drawings in this set were actually by Le Conte (Scudder 1888). Among the many drawings Scudder identified in this set was "*Ismeria*."

The John Abbot drawings in this set were commissioned in 1813 by J. E. Le Conte, who asked Abbot to illustrate Georgia Lepidoptera, including adults and early stages, but not hostplants (Rogers-Price 1984). Three years earlier, Le Conte's brother, Louis, had inherited the family's immense rice plantation (over 1250 hectares) near Riceboro, Liberty County, Georgia. Called "Woodmanston," this plantation was located 40 km (25 mi) southwest of Savannah, where John Abbot resided during most of the years from

1806 to 1816. A small portion of this plantation remains as a botanical garden on the National Register of Historic Places (Armes 1903, Bigley, 2001). J. E. Le Conte resided in New York, but regularly visited his brother at the plantation during the winter months (Scudder 1889, Barnhart 1917). The proximity of Woodmanston to Savannah surely enhanced Le Conte's relationship with Abbot, who may even have visited the plantation (Bigley 2001). Between the years 1813 and 1834, Abbot completed as many as 3000 illustrations for Le Conte (Gilbert 1998). The drawings commissioned in 1813 changed hands at least eleven times, were taken from Georgia to New York, then to France and England aboard ship. 135 years after their journey to Europe, they were returned to New York and ultimately found a home in South Carolina within 215 km (135 mi) of their origin.

In 1828, Le Conte took these Abbot drawings (and probably others) to Paris where he met with Boisduval to discuss the book they would eventually coauthor (Sallé 1883, Cowan 1969). After some were duplicated for engravings in Boisduval & Le Conte ([1833]), Boisduval apparently kept them for many years with the other illustrations he had assembled. Probably around 1850, Boisduval temporarily loaned the entire set to French lepidopterist Achille Guenée for his multi-volume publication on moths (Oberthür 1920, Cowan 1969). A number of moth species were described and figured by Guenée [1852–58] based on Abbot drawings, but the disposition of these illustrations was unknown (Gall & Hawks 2002). In 1876, three years prior to his death, Boisduval presented his library, ostensibly including these drawings, to good friend and fellow Parisian lepidopterist Louis M. A. Depuiset (Oberthür 1880). Depuiset organized all of Boisduval's assorted illustrations sometime before his death in 1886 (Oberthür 1920). Depuiset had also helped maintain Boisduval's enormous insect collection that was bequeathed in 1876 to lepidopterist Charles M. Oberthür of Rennes, France (Oberthür 1880, Clément 1887). Either before or after the death of Depuiset, Oberthür also acquired the set of original drawings (Oberthür 1920). In 1928, four years after Oberthür died, a book dealer named La Chavalier purchased his library (Brown 1974). During the next four decades, the drawings remained in private hands. They resurfaced on 4 November 1963 when Sotheby and Company auction house of London offered them for sale on behalf of "a lady" (Lot 1). They were then mounted in two half-morocco albums (Sotheby & Co. 1963). The Sotheby catalog included a full-page black and white reproduction of Abbot's drawing of *Citheronia regalis* (Fab.). Rare book firm H. P. Kraus of New York

City purchased the set from the Sotheby auction for a meager \$1456 U.S. (post-auction edition of Sotheby & Co. 1963). In 1964, H. P. Kraus again offered these drawings for sale, incorrectly describing them in the sales catalog (Kraus [1964]) as the original paintings for Smith & Abbot (1797). This catalog featured a full-page color reproduction of Abbot's drawing of *Nymphalis antiopa* (L.). H. P. Kraus had matted and repackaged the drawings in six blue half-morocco portfolio cases with gilt-lettered backs. They were offered for sale with a matching boxed copy of Smith & Abbot (1797) at a total price of \$12,500 U.S. (Kraus [1964]). Thankfully, the University of South Carolina obtained the drawings from this sale (Ridge 1966) and they are now safely deposited in the Department of Rare Books and Special Collections, Thomas Cooper Library, Columbia.

Rogers-Price (1983) and Gilbert (1998) followed Cowan (1969), who claimed this set included 148 drawings, all rendered by Abbot. However, it actually includes 149, and only 105 are consistent with the work of Abbot. These Abbot drawings were prepared in a horizontal format and depict life-sized figures, with early stages placed above the adults. Many have names and other pencil notations written by Abbot, Boisduval, and Le Conte (compared with known writing samples). Boisduval combined these drawings with others for use in Boisduval & Le Conte ([1833]) and perhaps other publications. All the drawings in the current set are rendered in watercolor and graphite, mostly on cream-colored wove paper, and mounted on stiff paper backing. The sheets measure approximately 26 cm × 16.5 cm, which is consistent with Scudder's (1888) description. The margins appear to have been trimmed, perhaps for their arrangement into volumes. They are numbered in pencil and the numbers match the butterfly drawings listed in Scudder's notes.

Only 34 of the 55 butterfly drawings in this set are by Abbot. Oberthür (1920) attributed 17 watercolors to Émile Blanchard; nos. 13–15, 17, 20, 23, 25, 32, 34, 40, 48–54. Undoubtedly ignorant of Oberthür's assessment, an unpublished inventory list of these drawings compiled by H. P. Kraus also credited 17 of them to Blanchard, matching those listed by Oberthür with two exceptions; no. 13 (as by Abbot) and no. 45 (as by Blanchard). Blanchard's drawings are quite distinctive, most being signed in ink "E. Blanchard, pit." They are rendered in a vertical format, do not include early stages, and depict only one side of dorsal adult figures. Until recently, one of these drawings (34) hung in the President's office at the University of South Carolina. Based on my own evaluation, the Blanchard drawings are 14, 15, 17, 20, 23, 25, 32, 34, 40, 45, 48–54. Num-

ber 37 is by P. Duménil. Numbers 4 and 13 may also be by Duménil. Number 44, depicting only the mature larvae of *Megathymus yuccae* Boisduval and Le Conte, is formatted similar to larval moth drawings in this set and was probably drawn by J. E. Le Conte.

Figures from this set of drawings were copied for 43 of the butterfly plates in Boisduval & Le Conte ([1833]). Many of the drawings include old pencil notations that refer to the corresponding published plates (e.g., "Pl. 1"), as well as numbers that were used to identify individual figures. All of Abbot's illustrations were rearranged for the published plates, but ten of Blanchard's multi-species drawings were reproduced in their original layouts. Several published plates in Boisduval & Le Conte ([1833]) lack similarly formatted original drawings in this set, explaining Oberthür's (1920) fear that some watercolors had been lost. Plant leaves and stems were inserted by the engravers into several published plates derived from Abbot's drawings in this set. 15 published plates included large hostplants and were evidently copied from other sets of Abbot illustrations. The whereabouts of these paintings is unknown, but S. H. Scudder obtained three sets of Abbot's "Notes to the Drawings of Insects" from Boisduval during his trip to Paris (Scudder 1888) (in Harvard University). They pertain to 191 paintings of insects with hostplants, including 172 Lepidoptera.

The moth drawings at the University of South Carolina are rendered in several formats and represent the work of at least one other artist in addition to Abbot. Seventy-one are consistent with Abbot's butterfly drawings in this set and some include Abbot's handwritten names. Many of the moth drawings, including 13 depicting only larvae, were prepared on smaller pieces of paper that were then pasted onto sheets matching the size of the larger Abbot drawings. One of these (90) includes an inscription by Boisduval that appears to credit the drawing to J. E. Le Conte, suggesting that at least some of these smaller drawings are by Le Conte. Oberthür (1920) noted that Boisduval separately kept 452 drawings by Le Conte measuring 13.8 cm × 8.8 cm, a size very similar to the small drawings in this set. This further explains Scudder's (1888) suspicion that some of the drawings in this set were actually rendered by Le Conte. Similarly formatted drawings attributed to Le Conte are deposited in the library of the American Philosophical Society (Rehn 1954). I examined digital scans of two such drawings and the style can be considered comparable to the smaller drawings in South Carolina. Boisduval planned, but never executed, a companion moth volume to *Histoire Générale* (Cowan 1969) and the plates for this installment would surely have been derived from this set of

drawings. This is implied by the presence of many unpublished names on the illustrations that were written by Boisduval and include the Latin suffix "nob." or "nobis", meaning "of us." Two small drawings in this set are identified as *Sphinx ulmi* (= *Ceratomia amyntor* Geyer) (90, 91), which Boisduval did not describe until 1875. Several of Boisduval's inscribed names were apparently "borrowed" by Guenée ([1852–58]), who used them for his own descriptions. Lawrence F. Gall recently examined Abbot's original drawings in this set and confirmed (pers. com.) that they were likely among those that Guenée consulted for his publication. I am assisting Patrick G. Scott (Associate University Librarian for Special Collections, Thomas Cooper Library) to identify the species depicted in this set of drawings, which will be made available for viewing on the Internet.

The original drawing of *Melitaea ismeria*. The original illustration used by Boisduval and Le Conte for their description of *M. ismeria* (Fig. 2) is contained in the first of six portfolio cases as packaged by H. P. Kraus. It is included on drawing 24; the number "24" being written in graphite in two different hands across the top margin. The numbers "5" and "6" are also written in graphite at the top right and extreme lower left, respectively, but their meaning is unknown. The figures of *M. ismeria* were drawn on the left half of the sheet. They are positioned under Boisduval's small handwritten pencil heading of "Diurn. [Diurnes] 27" and consist of a dorsal female, ventral female, mature larva, and pupa that match the figures on Plate 46 in Boisduval & Le Conte ([1833]). There are visible corrections to the heads, legs and abdomens of the adult figures. The right half of the sheet, "Diurn. 26," exhibits a dorsal female, ventral female, mature larva, and pupa of *Euptoieta claudia* (Cramer), matching the figures on published Plate 44 in Boisduval & Le Conte ([1833]). The left wings of both dorsal adult figures are unfinished, undoubtedly because engravers required only one completed side from which to extrapolate an entire illustration (probably the same reason E. Blanchard rendered only one half of his dorsal adult figures).

There are several inscriptions on the sheet in Boisduval's hand. Faint pencil notations are present below the figures of *M. ismeria*, reading "myrina Cr" and "myrissa God." and probably represent Boisduval's initial attempt to compare the figures with *Breuthis myrina* Cramer (= *Boloria selene myrina*) and *Argynnis myrissa* Godart (a proposed replacement name for *B. myrina*). Written below the figures of *E. claudia* are "claudia Cr" and "columbina F" (a synonym of the closely related *Euptoieta hegesia* (Cramer) and the name used by Boisduval & Le Conte ([1833]) for their

Plate 44). Inscribed in ink at the bottom left, also in Boisduval's hand, is "*M. pyone* Bd." This name does not conform to any butterfly taxa of the era, including those described by Boisduval (Kirby 1871). Boisduval perhaps proposed this name (i.e., *Melitaea pyone*), but later abandoned it in favor of *M. ismeria*.

The original figures of *M. ismeria* are clearly copies of those in Abbot's earlier painting of *C. gorgone* in The Natural History Museum, London (Figs. 6, 8, 11, 15). Abbot probably provided notes with these drawings, but they were undoubtedly lost during the numerous transfers of ownership. Abbot may have collected natural history specimens in South Carolina (Sanders & Anderson 1999), but the reference to "Carolina" in the original description of *M. ismeria* likely came from J. E. Le Conte, who traveled more widely in the southeastern United States.

Analysis of immatures. Brown (1974) discussed at length his inability to match the larva and pupa in the published plate of *M. ismeria* with known species of *Chlosyne*. However, he relied primarily upon 19th century larval descriptions and did not fully understand the polymorphic nature of *C. gorgone* larvae. Gatrell (1998) attempted to rear a large number of *C. gorgone* larvae, but few reached maturity and he did not discuss their coloration. Several of these larvae were forwarded to Thomas J. Allen to be photographed, but they also failed to reach maturity (T. J. Allen pers. com.).

To settle this issue, I contacted lepidopterists familiar with the immatures of eastern *Chlosyne* species. Nick V. Grishin has reared *C. gorgone* and *C. nycteis* from Texas, Paul M. Catling has reared *C. gorgone* from Ontario, Canada (Catling & Layberry 1998), and Richard F. Boscoe has reared *C. gorgone* from South Carolina, as well as *C. nycteis* and *C. harrisii* from populations in the northeastern United States. Boscoe reared *C. gorgone* from eggs obtained in Orangeburg County, South Carolina, only 96 km (60 mi) northeast of Burke County, Georgia, where Abbot obtained his figured specimens. Gatrell (1998) applied both populations to the nominate subspecies.

Grishin, Catling and Boscoe compared the mature larva in the original drawing of *M. ismeria* (Fig. 11) with mature larvae of all three eastern *Chlosyne* species. Grishin and Boscoe observed that mature larvae of *C. nycteis* are black with broad yellow or orange lateral bands (see Allen 1997, Plate 36, row 4). Boscoe noted that mature larvae of *C. harrisii* are orange with transverse black stripes on each segment (see Allen 1997, Plate 37, row 1). Grishin and Boscoe confirmed that mature larvae of *C. gorgone* are highly variable, possessing three primary color forms; all black ('ni-

gra'), black with orange or fulvous longitudinal banding ('bicolor'), and nearly all orange ('rubra'). Intermediates are common. Catling found young instars of *C. gorgone* to always be pure black, but mature larvae are either totally black (fm. 'nigra') or black with brownish-orange banding (fm. 'bicolor'). Although mature larvae of *C. nycteis* and *C. gorgone* can be similar, those of *C. nycteis* consistently lack orange or fulvous dorsal banding often present in *C. gorgone* fm. 'bicolor.' Abbot's larval figure displays yellowish-orange dorsal banding and as such most closely matches *C. gorgone*. Grishin provided a color photograph of a mature larva of *C. gorgone* fm. 'bicolor' approaching the pattern figured by Abbot (Fig. 13).

The pupa of *C. nycteis* is white with extensive black mottling (see Allen 1997, Plate 47, row 1). The pupa of *C. harrisii* is similarly white with irregular black, orange, and brown spotting (see exuvia photo in Williams 2002). Grishin and Boscoe described the pupa of *C. gorgone* as more uniform in color, brownish or grayish. I examined pupal exuvia of *C. gorgone* from three males and three females reared in 2000 and 2002 by Grishin from the vicinity of Dallas, Texas, and three males and one female reared in 1995 by Boscoe from ova obtained near the town of North, South Carolina (FSCA collection). Grishin also provided two color photographs of living *C. gorgone* pupae from Texas. These examples all possess an extremely intricate pattern of brown, gray and white maculation, resulting in an overall brownish-gray or reddish-brown coloration. There are pale dorsal highlights on many abdominal and thoracic segments, as well as an undulating series of small white spots across each wing encasement (Fig. 17). Abbot's painting of *C. gorgone*, as well as the original drawing and published plate of *M. ismeria* include the same depiction of a pupa that is unmistakably consistent with *C. gorgone*. These figures even include the pale segmental highlights and row of white forewing spots (as an unbroken line) (Figs. 14–17).

Written descriptions of larval *C. gorgone* by several authors, including Klots (1951), and Brown et al. (1955), obviously repeated the description given by Holland (1898), who considered *gorgone* and *ismeria* synonymous and derived his information from the published plate of *M. ismeria*. Consequently, these later authors unwittingly associated *M. ismeria* with *C. gorgone*, including F. M. Brown who fundamentally disagreed with this synonymy(!).

A search for John Abbot specimens. Surviving John Abbot specimens of *Chlosyne* would reveal much about the species he encountered in Georgia. Brown (1974) and Gatrell (1998) could not locate any such

specimens. I searched additional sources for evidence of their existence.

Jacob Hübner (1806–[1838]) figured at least four species based on specimens from “Georgia” and “Georgien.” Authors, such as Clark & Clark (1941) and Brown (1974), have speculated that such specimens came from John Abbot, but their actual source remains obscure. Unfortunately, no text accompanied Hübner’s plate of *Dryas gorgone* and Hübner’s manuscripts do not provide additional insight into their origin (Hemming 1937). According to notations in the publication, as well as Hübner’s manuscripts, North American specimens used for his plates came from Georgia, New York, Pennsylvania, Virginia, and “America” (Hemming 1937). Although the specimens of *C. gorgone* were most likely from Abbot, we may never be certain. During the early 19th century, Hübner’s Lepidoptera type specimens were obtained by Vincenz Abbate Edler von Mazzola. In 1823, Mazzola’s European Lepidoptera collection was deposited in the Emperor’s “Naturalien-Kabinett” in Vienna, Austria. It is believed that many of these specimens burned in a fire in 1848 (probably during the revolution that year). The few surviving Hübner specimens are now deposited in the Naturhistorisches Museum in Vienna (Horn et al. 1990). Regrettably, Mazzola removed all of Hübner’s original labels, complicating positive identification of Hübner material. The fate of Hübner’s North American specimens is unknown and no *C. gorgone*, *C. nycteis*, or *C. harrisii* are now deposited in the Naturhistorisches Museum (M. Lödl pers. com.).

Edward Doubleday wrote in 1840 that, “In all old collections are many specimens collected by Abbot; at Francillon’s, Donovan’s and other sales, some of these have been dispersed, and have crept into collections nominally British only” (Scudder 1869). After John Francillon’s death in 1816, his collection of insects was sold in London in four separate auctions in May and July 1817 and June 1818. The sales catalog from July 1817 (King 1817) contained numerous listings for “beautiful Georgian Lepidoptera” and other insects. Unfortunately, there were no specific listings that could suggest *Chlosyne*. The bulk of Francillon’s collection, including 72 drawers of foreign Lepidoptera, was sold 11–19 June 1818. The Lepidoptera portion of the 1818 auction catalog (King 1818) listed dozens of specimens from Georgia, especially moths. Among the contents of Drawer 32, Lot 6, were three Georgia specimens of an unidentified “*Argynnis*.” This lot contained similar small species, including North American *B. s. myrina* (as “*Myrina*”) and *Phyciodes tharos* (Drury) (as “*Tharos*”). Alexander Macleay, an English naturalist and honorary Secretary of the Linnaean So-

ciety of London, acquired a large portion of this collection. In 1825, Macleay moved from England to Australia to serve as Colonial Secretary of New South Wales. His insect collection now serves as the core of the Macleay Museum, University of Sydney (Barker 1999). Among numerous North American insect specimens in the Macleay Museum are many labeled simply “Georgia” that undoubtedly originated with Abbot. A digital scan of a label taken from a beetle specimen from Georgia shows it was written in Abbot’s hand (Fig. 25), confirming that Abbot personally labeled at least some of his own specimens. A late 19th century curator foolishly discarded many of the original labels in favor of more carefully written substitutes (M. Humphrey pers. com.). Macleay incorporated Francillon’s specimens into his own collection and the original organization was lost. Unfortunately, no *C. gorgone*, *C. nycteis*, or *C. harrisii* were found in the Macleay Museum collections (M. Humphrey, K. Fahey pers. com.).

In an astonishing letter to T. W. Harris dated 30 April 1842, E. Doubleday wrote that he had found in the British Museum “some specimens of *Melitaea Ismeria*, collected by Abbot,” adding, “It is nearer *M. tharos* than Boisduval’s plate would lead you to imagine” (Scudder 1869). In 1847, Doubleday again referred to *M. ismeria* in the British Museum (Doubleday & Hewitson 1846–50). Probably between 1906 and 1908, when he taught classes in Europe, W. T. M. Forbes saw Georgia specimens of *C. gorgone* in The British Museum (NH) that he later reported as “from Abbot” (Forbes 1960). Ironically, Forbes (1960) mirrored the earlier observations of Doubleday, stating that these specimens looked “at first glance much more like *tharos* than *carlota*.” Gatrell (1998) attempted to locate potential Abbot *Chlosyne* specimens in The Natural History Museum (“BMNH”), but was unsuccessful. Nonetheless, a single male *C. gorgone*, labeled simply “Georgia,” was discovered among specimens pulled from the main collection by Lionel G. Higgins during his work on *Chlosyne* (P. Ackery pers. com.). The specimen (Fig. 23) has a damaged right hindwing and lacks a left antenna, but is otherwise in good condition.

In addition to the locality label, this specimen of *C. gorgone* bears a small round label reading “520” with another character nearly obliterated by pinholes. A third label, probably placed during the late nineteenth century, reads, “*carlota* Reak.” (Fig. 25). Phillip R. Ackery (Collections Manager) confirmed my suspicion that “520” corresponded to a species listing in E. Doubleday’s manuscript catalog of Lepidoptera specimens in the British Museum (Entomology Library, The Natural History Museum) (see Harvey et al. 1996). The

entry for species 520 was given as, "Argynnis Ismeria Boisduval" and listed specimens "a, b, Georgia; c, Ohio." The published version of this catalog (Doubleday 1844–48) was not numerical and these specimens were identified as "*Melitaea Ismeria, Boisd. et Leconte.*" Doubleday undoubtedly affixed the numeric label during the preparation of his manuscript catalog and the obscure character on this label is likely a "b," matching the specimen he listed. Doubleday's association of *M. ismeria* with *C. gorgone* is consistent with his 1840 identification of Abbot's painting in London. The Ohio specimen listed by Doubleday is also extant and represents *C. gorgone*. The locality labels on both the Ohio and Georgia specimens are similar, being less discolored with a characteristic double black line drawn across the lower edge (Fig. 25).

Although Doubleday's published catalog (Doubleday 1844–48) did not indicate the origin of these *C. gorgone* specimens in the British Museum, his original manuscript gave "Dyson" as the source of the Ohio specimen. English naturalist David Dyson (1823–56) spent nearly the entire year of 1843 in America where he collected insects, birds, shells and plants, "across the Allegheny Mountains, and as far as St. Louis" (Anonymous 1856). Other old butterfly specimens in the collection from the United States bear locality labels with the same characteristic double black line. The similarity of the labels suggests that Dyson collected them all. However, Ives (1900–01) claimed Dyson was unable to read or write and utilized "a kind of hieroglyphic marking understood only by himself." If this is true, Dyson may have verbally communicated his collecting localities to Doubleday, who recorded the data only in his manuscript catalog. Comments by Doubleday (1844) show that they were personally acquainted at the time. The locality labels actually look to be of more recent provenance and were probably affixed by a later museum worker in an attempt to standardize the data on these old specimens. In addition, Dyson's route in America implies that he followed the Ohio and Mississippi River Valleys and did not reach as far south as Georgia. Doubleday (1844–48) listed Dyson as the source of other Ohio specimens, but none from Georgia. Finally, Doubleday's 1842 discovery of *M. ismeria* in the British Museum predated Dyson's trip to America and there is no indication that Doubleday ever applied the name *ismeria* to any species other than *C. gorgone*. Based on available evidence, there is little doubt that the surviving *C. gorgone* from Georgia is one of the specimens that Doubleday identified as *M. ismeria* from John Abbot.

Purported Abbot specimens were acquired by the British Museum from many sources. Two years before

Doubleday discovered the *M. ismeria* specimens in the British Museum, he wrote that "many Lepidoptera of Abbot's collecting" were bought by the museum from "the late Mr. Milne's collection" (Scudder 1869). The George Milne (or Mylne) collection of 1749 specimens, mostly Lepidoptera and Coleoptera, was purchased by the museum in June 1839 (Stevens 1839, Stearn 1981). Auction lots 195 and 196 of the Lepidoptera portion of the Milne sales catalog listed "several rare species of *Melitaea*" and "various species of *Melitaea*," respectively (Stevens 1839). The surviving Georgia specimen of *C. gorgone* may have been obtained from this collection. The fate of the remaining Georgia specimen of *M. ismeria* that Doubleday listed as "520a" is unknown.

No Georgia specimens of *C. nycteis* or *C. harrisii* are currently deposited in The Natural History Museum (P. Ackery pers. com.). Doubleday's original description of *nycteis* did not include Georgia within the general distribution of "Middle States" (*M. ismeria* was listed separately from "Southern States"). Doubleday's catalog predated the original description of *harrisii* by nearly 20 years. Most assuredly, if Doubleday had found this insect in the British Museum, he would have recognized it as new and promptly described it with *nycteis* in Doubleday & Hewitson (1846–50).

DISCUSSION

The true identity of *Melitaea ismeria*. The plate of *M. ismeria* in Boisduval & Le Conte ([1833]) was engraved from the original John Abbot drawing now deposited in the Thomas Cooper Library, University of South Carolina. The figures in this drawing (ca. 1815) (Fig. 2) are analogous to those in Abbot's earlier painting of *C. gorgone* (ca. 1804) (Fig. 3) deposited in The Natural History Museum, London. Therefore, *M. ismeria* is synonymous with *C. gorgone* (Figs. 4, 6–9, 10–12, 14–16). The figured adults and early stages were simplified with each successive copy, resulting in a published plate that held little resemblance to the initial painting. This imprecision contributed to nearly two centuries of nomenclatural confusion.

John Abbot was approximately 64 years of age when the original drawing for *M. ismeria* was completed. Although he apparently collected and painted natural history specimens into his eighties, he became less capable of travel in his later years, spending more time painting than exploring the countryside for new discoveries. In an 1834 letter to T. W. Harris from Abbot's long-time friend, Augustus G. Oemler, Abbot was described as "very corpulent, but still exercises his pursuit of hunting birds and drawing—but engaging boys to run after butterflies" (Dow 1914). J. E. Le Conte re-

quested that Abbot include both adults and immatures in his paintings. Surely, it would have been a daunting task for Abbot to collect all new specimens and repeat his laborious life history studies. This is especially true for species he considered rare or uncommon, such as *C. gorgone*.

Throughout his career, Abbot was known to maintain a master set of template drawings with accompanying life history notes from which to create additional renderings of the same species. Paintings in John Francillon's volumes were numbered so additional copies could be ordered for other buyers (Rogers-Price 1983, Gilbert 1998). Abbot completed duplicate paintings for many individuals, including J. Francillon, A. G. Oemler, and English naturalist William Swainson. Ten out of 30 surviving Abbot paintings of *Catocala* Schrank moths for Francillon and Oemler are exact duplicates (Gall & Hawks 2002). One of the illustrations that Abbot duplicated was the "Cross wort Fritillary Butterfly" (*C. gorgone*).

From about 1813 to 1818, Abbot provided to A. G. Oemler at least 193 paintings that are now deposited in the Houghton Library, Harvard University. Plate 11 of this set, measuring 34 cm × 24 cm, is a duplicate of the earlier *C. gorgone* painting in The Natural History Museum, London. In the accompanying "Notes to the Drawings of Insects," Abbot identified it as the "Cross Wort Fritillary" and added, "Feeds on Cross Wort, and Sun flower, changed 17th May—bred 26th. Frequents the Oak woods of Burke County, but is not common" (S. Halpert pers. com.). Between 1816 and 1818, Abbot also completed 103 illustrations of insects for W. Swainson, mostly Lepidoptera not figured in Smith & Abbot (1797). Swainson emigrated to New Zealand in 1840 and the paintings were acquired in 1927 by the Alexander Turnbull Library, Wellington (Parkinson 1978, 1983). Plate 17 in this set is another duplicate of Abbot's *C. gorgone* painting in London (Figs. 3, 5, 21). It measures 34.2 cm × 24.8 cm and was figured in color by Parkinson and Rogers-Price (1984). Again, Abbot's entry in his accompanying "Notes to the Drawing of Insects" is the same: "Cross wort Fritillary Butterfly. Feeds on Cross wort, and sunflower, Tyed itself up by the tail 16th May, changed 17th bred 26th. Frequents the Oak Woods of Burke County, but is not common."

To fulfill Le Conte's commission, Abbot likely relied on his template drawings as often as possible. A comparison of engraved plates in Smith & Abbot (1797) and Boisduval & Le Conte ([1833]) shows that many contained duplicate figures. Ten of the 23 species treated in both publications included identical depictions of larva and/or pupa. Many of Abbot's other paintings also share figures with the drawings used by

Boisduval & Le Conte ([1833]). It is obvious that the drawing used for the description of *M. ismeria* is no more than an abbreviated version (no male butterfly or hostplant) of the same *C. gorgone* illustration that Abbot provided to Francillon, Oemler and Swainson. Traces of corrected graphite sketch lines are visible around the adult figures in the original drawing of *M. ismeria*. These lines correspond to the outlines of the counterpart figures in Abbot's duplicate paintings of *C. gorgone* (Figs. 18–19) and offer convincing evidence that Abbot indeed copied this drawing from his template of *C. gorgone*. Abbot's later copies were more carelessly rendered than the earlier paintings for Francillon (Figs. 4–6). In 1819, Swainson even complained to Abbot that the drawings he received were "not so highly finished" as those published in Smith & Abbot (1797) (Parkinson 1978). The three known copies of the *C. gorgone* illustration, including the original drawing of *M. ismeria*, were probably completed within a five-year period (1813–18) during Abbot's 64-year residency in Georgia. Artwork of John Abbot is deposited at many locations and there may be additional surviving copies of this rendering.

Assessment of the current neotype. Article 75.3.5 of ICZN (1999) states that a neotype is validly designated only if it is "consistent with what is known of the former name-bearing type from the original description and from other sources." Although the original description of *M. ismeria* did not include a name-bearing type specimen, the neotype of Gatrell (1998) is not consistent with the identity of the intended species. To promote nomenclatural stability, the neotype *Melittaea ismeria* Boisduval & Le Conte, [1833] should be set aside and another designated to reflect synonymy with *C. gorgone*. An ICZN application has been prepared to achieve this objective (Calhoun et al. under consideration). Opler and Warren (2002) referred to the preparation of another petition to suppress the use of *ismeria* as "a possible senior synonym of *nycteis*," but it was not submitted in deference to the present study.

Commentary on Brown (1974) and Gatrell (1998). Despite his thorough treatment, Brown (1974) provided misleading information. He maintained that, "Scudder (1872) stated that he had found the original of Abbot's plate of *ismeria* in the British Museum (N. H.) and that it represented the male of Huebner's *gorgone*." In actuality, Scudder (1872a) made no such allusions and simply listed *ismeria* among the John Abbot paintings in the British Museum. Scudder did not elaborate. Strecker (1878) implied this claim when he credited Scudder with revealing the published figures of *M. ismeria* "were copied

from Abbot's unpublished drawings and poorly enough copied at that." It is possible that Scudder wrote to Strecker about the original drawing he found in Boisduval's library. Nonetheless, Scudder recognized the resemblance between Abbot's earlier painting and the published plate of *M. ismeria*. He further associated the adult figures with *Eresia carlota* (= *C. gorgone*), which was loosely described five years prior to his visit to London. Brown inexplicably disregarded the obvious similarity of Abbot's painting to the published figures of *M. ismeria*. He apparently intended to reproduce the painting, but there is no figure associated with his reference to "(our figure 5)." Furthermore, he never actually reported the identity of the species depicted, undoubtedly contributing to the misconceptions of Gatrell (1998).

Gatrell (1998) misinterpreted crucial information. He alleged Brown (1974) "established *ismeria* as a valid (but unidentified) species separate from *gorgone* and postulated that it could well be *C. nycteis*." In fact, Brown could not positively identify *M. ismeria* and recommended that the name be ascribed only to the published plate and not to any existing species. Brown finally suggested the published plate was a fictitious representation.

Most importantly, Gatrell misunderstood the status of Abbot's painting and accompanying notes in The Natural History Museum (Fig. 3) and did not confirm the identity of the depicted butterfly or hostplant. He wrongly assumed *Helianthus trachelifolius*, as inscribed on Abbot's notes page, was the identity of the figured plant and mistakenly associated it with *Helianthus strumosus* L. (Asteraceae). Gatrell ultimately disregarded the painting (as unidentifiable?) and erroneously applied the life history notes to support his proposed synonymy with *C. nycteis*. Not only are the notes referable to *C. gorgone*, their forced application to *C. nycteis* is tenuous. Abbot's reference to "oak woods" is consistent with Gatrell's "oak sandhill" habitat of *C. gorgone*, but not the riparian habitats associated with *C. nycteis* in Georgia (Harris 1972), including the three specimens Gatrell personally collected along the Savannah River. In the notes for his various illustrations, Abbot plainly differentiated upland "oak woods" from bottomland "swamps." Gatrell also argued that the dates given in Abbot's notes more accurately coincide with *C. nycteis*, which emerges a month later than *C. gorgone* in Burke County, Georgia. These dates cannot be directly compared, as Abbot's data was not from a wild-collected adult and his rearing conditions could have resulted in abnormal development. According to Gatrell (1998), populations of *C. gorgone* in coastal Georgia and South Carolina

are univoltine with diapausing third instar larvae, but Gatrell (1993) reared two adults from ova obtained earlier the same year. The life cycle for these individuals was 42 days, showing Abbot could also have reared his specimen from an ovum he obtained at the onset of the normal adult flight period in mid-April, which produced an adult on 26 May of the same season.

Finally, Gatrell (1998) agreed with Harris (1972) who believed the original plate of *Dryas gorgone* in Hübner (1806–[1838]) was engraved from a painting by John Abbot. While the figured specimens probably came from Abbot, the original illustration and engraving were undoubtedly the work of Jacob Hübner himself. Representations of *C. gorgone* by Hübner and Abbot reveal very different portrayals and artistic styles (Figs. 4–6, 20). Hemming (1937) described Hübner as a "draughtsman and illustrator of exceptional skill" whose propensity for drawing was noted at an early age. Unpublished, typewritten research of Cyril F. dos Passos, dated 14 October 1955, was found inserted into his personal copy of Hübner (1806–[1838]) (Wittenberg University), in which he determined, "the plates of volumes 1 and 2 are by Hübner with the exception of four (4) plates by Geyer, numbers [85], [119], [186], and [209], and the plates of volume 3 are by Geyer" (brackets of dos Passos). Many of the original paintings for this publication by Carl Geyer (Hübner's assistant) were acquired in 1949 by The Natural History Museum, London, as part of the Baron von Rosen manuscript collection (Harvey et al. 1996). Hübner's original illustration of *Dryas gorgone* remains elusive. Hemming (1937) did not find it in any institutions known to contain artwork used for this publication. The Natural History Museum acquired additional Hübner manuscripts with the von Rosen documents (Harvey et al. 1996), but a search of this material was also unsuccessful (V. Veness pers. com.).

John Abbot may have encountered more than one species of *Chlosyne* in Georgia, but available evidence precludes all but *C. gorgone*. When Edward Doubleday described *Melitaea nycteis* in 1847, he failed to see any resemblance with *Melitaea ismeria*. Within seven years of the original description of *M. ismeria*, Doubleday had correctly determined the intended species as the insect now known as *C. gorgone*. Samuel H. Scudder corroborated Doubleday, but his findings were disregarded. It took 160 years to prove they were both correct. To quote Herman Strecker (1878), "Time at last sets all things even."

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Abbot's illustrations and purported specimen in London. Gatrell designated the type locality of *Dryas gorgone* as "Burke County, Georgia," but this county is 2,155 sq. km (832 sq. mi) in size. Gatrell (1998) did not publish all the information that appears on the labels of his neotype specimen. The collection location was given as "River Rd at Hancock Landing Rd." The type locality should be further restricted to the town of Hancock, Burke County, Georgia. Hancock is located only 11 km (7 mi) northeast of Abbot's former residence in Burke County.